IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

SAINT LAWRENCE COMMUNICATIONS LLC, **Plaintiff,** **v.** **ZTE CORPORATION, ZTE USA, INC., and ZTE (TX) INC.,** **Defendants.**	§ § § § § § § § § § §	**Case No. 2:15-cv-00349-JRG (Lead Case)** **JURY TRIAL DEMANDED**
SAINT LAWRENCE COMMUNICATIONS LLC, **Plaintiff,** **v.** **MOTOROLA MOBILITY LLC,** **Defendants.**	§ § § § § § § § § § §	**Case No. 2:15-cv-00351-JRG (Consolidated Case)** **JURY TRIAL DEMANDED**

PLAINTIFF SAINT LAWRENCE COMMUNICATIONS LLC'S
REPLY CLAIM CONSTRUCTION BRIEF

TABLE OF CONTENTS

TABLE OF AUTHORITIES

Cases

Statutes

I. INTRODUCTION

Defendants contend that 53 claim terms need to be construed. Of those 53 terms, Defendants assert that 36 terms are indefinite under 35 U.S.C. § 112(6), including 15 terms that do not use the word "means." Defendants do not address the specifics of those individual terms and instead contend that they are all indefinite for the same reason: namely, that a person of ordinary skill in the art would not understand that the digital data compression and decompression algorithms described in the asserted patents are implemented ***on a computer***. Defendants improperly base their indefiniteness argument on circular logic: first, despite the nature of digital data compression and decompression and the context of the inventions, Defendants incorrectly assume—without any evidence from the patents—that those claim elements must be implemented solely in specialized hardware circuitry; second, Defendants contend that because the patents do not adequately disclose this specialized circuitry, those claim elements must be indefinite.

At its core, Defendants' argument unduly ignores the efforts of the PTO in examining the claims and the presumption of validity for over 35 different terms. Indeed, despite the fact that five different examiners reviewed the specifications, Defendants' argument would require this Court to conclude that ***no*** person skilled in the art would understand that the patents' digital data compression and decompression algorithms are performed on a computer. However, engineers at ZTE, Motorola and other companies implement the disclosed mathematical formulas ***verbatim*** on computers through the AMR-WB standard at issue in this case, which further emphasizes that the terms are readily understood by persons of skill in the art and do not require further construction. *See O2 Micro Int'l Ltd. v. Beyond Innovation Tech. Co.*, 521 F.3d 1351, 1362 (Fed. Cir. 2008) (noting that courts are not required to construe every limitation). Defendants further fail to show that any of their proposed constructions are justified in view of the patents.

II. THE ALLEGED MEANS-PLUS-FUNCTION TERMS

A. Defendants fail to show that 36 claim terms are indefinite under § 112.

For computer-implemented terms, Federal Circuit law allows a patentee "to express [a] procedural algorithm in any understandable terms including as a ***mathematical formula***, in prose, or as a flow chart, or in any other manner that provides sufficient structure." *Typhoon Touch Tech., Inc. v. Dell, Inc.*, 659 F.3d 1376, 1385 (Fed. Cir. 2011) (emphasis added). Defendants do not argue that ***any*** of the algorithms disclosed in the asserted patents are inadequate under § 112(6). Defendants also do not contend that a person skilled in the art would be unable to implement those algorithms on a computer. In fact, the AMR-WB standard at-issue in this case includes reference code that implements the same mathematical algorithms disclosed in the patents.

Instead, Defendants' indefiniteness argument depends upon one dubious premise: that a person of ordinary skill in the art—a person with an intricate understanding of digital speech encoding and decoding technology—would not understand that the patents implement the digital data compression and decompression algorithms ***on a computer***. *See Telecordia Techs., Inc. v. Cisco Sys., Inc.*, 612 F.3d 1365, 1376 (Fed. Cir. 2010) ("Whether the written description adequately sets forth the structure corresponding to the claimed function must be considered from the perspective of a person skilled in the art."). Instead of considering the entirety of the patent specifications from the perspective of a person skilled in the art, Defendants improperly focus on the mere fact that "the words 'computer' and 'processor' do not appear anywhere in the asserted patents." *See* Response, Dkt. 74 at 13. However, the Federal Circuit has already rejected this exact same argument under nearly identical circumstances:

> Neither the written description nor the claims uses the magic word "computer" nor do they quote computer code that may be used in the invention. Nevertheless, when the written description is combined with claims 8 and 9, the disclosure satisfies the requirements of § 112 ¶ 2.

> As the written description discloses, the clauses in question claim a device that receives digital data words from a memory and data input from a user. The device then computes, from the received data, the current distribution by mathematical operations including a matrix inversion or pseudo inversion, and then outputs the result to a display.
>
> …
>
> Clearly, a unit which receives digital data, performs complex mathematical computations and outputs the results to a display ***must be implemented by or on a general or special purpose computer*** . . . . To bolster this result, we note that, in the medical imaging field, it is well within the realm of common experience that computers are used to generate images for display by mathematically processing digital input.

In re Dossel, 115 F.3d 942, 946–47 (Fed. Cir. 1997). Similarly, in *HTC Corp.*, the Federal Circuit stated that "[a]lthough the specification here does not ***literally*** disclose a processor and transceiver, a person skilled in the art would understand that a mobile device would have to contain a processor and transceiver." *HTC Corp. v. IPCom GmbH*, 667 F.3d 1270, 1279 (Fed. Cir. 2012) (rejecting defendant's indefiniteness argument). Defendants' same argument fails for the same reasons.

The asserted patents are all directed generally toward the compression, transmission, and decompression of digital speech data by mobile devices in a cellular network. *See* Dkt. 71, Ex. D at Fig. 5 and 5:31–34 (stating that "Fig. 5 is a simplified, schematic block diagram of a cellular communication system in which the wideband encoder of Fig. 1 and the wideband decoder of Fig. 2 can be used"). This process involves complex mathematical computations performed thousands of times per second. *See id.* at 2:9–11 (noting that the audio signals are initially sampled 16,000 times per second). The patents describe performing the compression and decompression algorithms in the ***digital*** domain and computer memory is used to store the digital data. *See id.* at 1:24–33 (noting that "[a] speech encoder converts a speech signal into a digital bit stream which is transmitted over a communication channel (or stored in a storage medium)" and that the speech decoder "processes the transmitted or stored bit stream to convert it back to a sound signal"). As with the "medical imaging" technology from *In re Dossel*, it is "common experience" that

computers are used to encode and decode speech data by mathematically processing digital inputs.

Moreover, the patents use variations of the term "compute" ***over 250 times***. For example, the patents state that "the synthesis output is ***computed*** for all, or a subset, of the codevectors;" that a "synthesis filter is ***computed***;" that "parameters representing the speech signal in the frame are ***computed***, encoded, and transmitted;" that "the weighted signal $s_w(n)$ is ***computed*** by a weighting filter;" that the "periodicity factor α is ***computed*** in the voicing factor generator;" and that the "enhanced excitation signal u` is ***computed*** by the adder." The patents also reference "fixed-point implementation of the algorithm[s]" and the use of "single-precision arithmetic," which are both concepts central to digital computing.[1] *See* Dkt. 71, Ex D at 2:17–18; 8:38–39.[2] In response, Defendants' expert opines that such references could also apply to calculations performed by a device other than a digital computer, such as an "abacus," a "slide rule" or even by "simple hand calculations." *See* Dkt. 74, Clements Decl. at ¶¶ 166–67. Defendants cannot credibly suggest that a person skilled in the art of digital speech encoding and decoding technology would or even could implement the complex algorithms using an abacus, a slide rule or by hand.

Indeed, the patents provide virtually endless examples of digitally computing various filters, factors, and outputs—and more importantly—provide detailed algorithms that adequately

[1] "Fixed-point" computing refers to the representation of fractional numbers in a computer with a fixed decimal point (*e.g.*, 1.234). *See* Ex. A at 377 ("fixed-point"). In "floating-point" computing, fractional numbers are represented by a form of scientific notation (*e.g.*, 1234×10^{-3}). *See id.* at 380 ("floating-point"). "Single-precision" arithmetic refers to "the use of a single computer word to represent a number." *See id.* at 905 ("single precision").

[2] Motorola's ***own*** patent also refers to a "fixed point" computer that encodes and decodes speech data for transmission. *See* Ex. B at 4:55–67 (stating that "the DSP 301 is a 16 bit fixed point DSP operating at 80 megahertz (MHz)" that converts an analog audio signal "to a digital stream that represents the actual data or voice" and then "encodes the voice or data using the first codec 303 or the second codec 305, filters the signals using the appropriate set of filters and transmits the encoded data/voice to the interface connector 309").

disclose each of those functions. As the Federal Circuit has stated, "[a] computer-implemented means-plus-function term is limited to the corresponding structure disclosed in the specification and equivalents thereof, ***and the corresponding structure is the algorithm***." *Harris Corp. v. Ericsson Inc.*, 417 F.3d 1241, 1253 (Fed. Cir. 2005) (emphasis added). Thus, under the relevant law, the proper inquiry is whether the specification discloses a sufficient algorithm for performing the claimed function. *Noah Sys., Inc. v. Intuit Inc.*, 675 F.3d 1302, 1312 (Fed. Cir. 2012).

Defendants do not dispute that the algorithms adequately describe the claimed functions. Rather, Defendants argue that the claims are indefinite because the disclosed functions "could" be performed by undisclosed analog circuitry. However, the patents clearly disclose performing the identified mathematical operations on ***digital*** data, and Defendants' assumption that those functions could be implemented in ***analog*** circuitry is incorrect. *See* Supp. Decl. ¶ 9. As stated in the patents, the disclosed encoders operate "at 13 kbits/second," which is a unit that is only relevant to digital computing. *Id.* For the § 112(6) terms, the corresponding structure is the "special purpose computer" that results from performing the disclosed algorithms on a digital computer—not analog circuitry. *See WMS Gaming Inc. v. Int'l Game Tech.*, 184 F.3d 1339, 1349 (Fed. Cir. 1999) (noting that in a computer-implemented means-plus-function claim, "the disclosed structure is not the general purpose computer, but rather the special purpose computer programmed to perform the disclosed algorithm."). Because the patents recite detailed mathematical algorithms performed on a computer, the resulting "special purpose computer" is adequately disclosed from the perspective of a person skilled in the art. As a result, Defendants' argument that the patents "fail to disclose" ***analog*** structures such as a "field programmable analog array circuit," "hybrid analog/digital circuits" or "analog amplifiers" is irrelevant. *See* Response, Dkt. 74 at 15.

Similarly, Defendants' reliance on the *Fujitsu* case from the Northern District of Illinois is

misplaced. *See Fujitsu Ltd. v. Tellabs Ops., Inc.*, 782 F. Supp. 2d 625, 651 (N.D. Ill. 2011) (finding a lack of structure because the "controlling means" could also include "any arrangement of electrical, electro-mechanical, or electro-optical components, such as switches"). Defendants' have not and cannot argue that the digital compression and decompression algorithms can be performed by a variety of "switches." Instead, encoding and decoding algorithms are routinely implemented by computers, resulting in the "encoder" and "decoder" illustrated in Figures 1 and 2. *See* Dkt. 71, Ex. D at 5:21–26; *Motorola Mobility, Inc. v. TiVo, Inc.*, Case No. 5:11-cv-053, 2012 WL 6087792, *27 (E.D. Tex. Dec. 6, 2012) (Gilstrap, J.) (holding that "the disclosures of an 'encoder 22' and 'decoder 19' are sufficient corresponding structure to avoid indefiniteness").

Defendants' argument that the patents fail to disclose specific ***types*** of digital computers, such as "field-programmable gate arrays" or "digital signal processors," is also unavailing. A patentee's disclosure "need not be so particularized as to eliminate the need for any implementation choices by a skilled artisan," but rather only needs to be sufficiently defined to render the bounds of the claim "understandable by the implementer." *See Ibormeith IP, LLC v. Mercedes-Benz USA, LLC*, 732 F.3d 1376, 1379 (Fed. Cir. 2013). Here, a person skilled in the art would readily understand that the disclosed algorithms are implemented on a digital computer, such as a DSP or an FPGA, and it would be a matter of design choice as to what type of computer to use for those speech compression and decompression functions. *See* Supp. Decl. ¶ 12. Thus, under the Federal Circuit cases cited by St. Lawrence in its Opening Brief and this Reply Brief, the disclosure of the asserted patents provides adequate structure from the perspective of a person skilled in the art.

Nonetheless, Defendants allege that the cases cited by St. Lawrence are inapposite because they each explicitly disclosed a computer. However, none of those cases held that the magic word "computer" was required, and in fact, "[t]he law does not require that structure be explicitly

identified as long as a person of ordinary skill in the art would understand what structure is identified in the specification." *Aristocrat Techs. Ltd. v. Multimedia Games, Inc.*, 266 Fed. Appx. 942, 946 (Fed. Cir. 2008) (citing *In re Dossel* and noting that "[w]e have held that a computer was the intended structure even when it was not expressly recited"). In the present case, the patents disclose adequate structure in the form of detailed algorithms that are implemented verbatim when practicing the AMR-WB standard. Moreover, the patents discuss implementing these algorithms through the use of a computer. *See* Supp. Decl. ¶¶ 9–12. As a result, Defendants' simply have not shown by "clear and convincing evidence" that the 36 terms-at-issue are indefinite under § 112.

III. THE REMAINING TERMS FOR CONSTRUCTION

A. Defendants' "Specialized Circuit" constructions are improper.

Defendants' similar constructions for "circuit" and "device" are an improper attempt to unduly restrict those terms to specialized "discrete" hardware components. However, for the same reasons as above, Defendants' attempt to limit the claim elements to discrete hardware circuitry should be rejected. As detailed in St. Lawrence's previous briefing, the patents explicitly disclose computing filters in the digital domain. For example, "a linear prediction (LP) ***filter*** is ***computed*** and transmitted every frame." Dkt. 71, Ex. E at 1:50–51. "The enhanced signal c_f is therefore ***computed by filtering*** the scaled innovative codevector gc_k through the innovation filter 205 (F(z))." Dkt. 71, Ex. A at 15:48–50. Similarly, just as the filters are algorithms that are performed by a computer, the patents describe implementing the other "circuit" terms in the form of algorithms performed by a computer. Specifically, as discussed in St. Lawrence's Opening Brief, the patents describe addition and subtraction algorithms that operate on the digital data. Contrary to Defendants' argument, none of the patents restrict these addition/subtraction algorithms to being performed by a discrete "specialized circuit" or exclude the use of a computer.

Indeed, at least one Court in this district has already rejected a similar argument. In *Saxon Innovations*, the plaintiff's construction for the term "signal processing circuit" captured both microprocessors and discrete signal processors. In contrast, the defendant's construction excluded microprocessors. In rejecting the defendant's construction, the court observed that "[t]he plain meaning of the word 'circuit' implies a broader structure, which may or may not include a signal processor." *Saxon Innovations, LLC v. Nokia Corp.*, Case No. 6:07-cv-490, 2009 WL 2413261, *8 (E.D. Tex. Jul. 31, 2009); *see also Biax Corp. v. Sun Micro., Inc.*, Case No. 2:06-cv-364, Dkt. 155 at 8 (rejecting defendant's attempt to limit the term "circuit" to a "component outside the processor elements" and noting that "[o]n its face, the term 'circuit' is broader than Sun's proposed definitions"). Similarly, the Court should reject Defendants' unduly narrow construction.

B. The patents do not limit a "signal path" to a series of circuits.

As stated in St. Lawrence's Opening Brief, the term "signal path" appears verbatim in the AMR-WB standard's technical specification, which emphasizes that a person of ordinary skill in the art would readily understand its meaning. *See* Dkt. 71, Ex. M at 25. Moreover, the reference code developed by the patentees that accompanies the AMR-WB standard implements these "signal paths" in the form of a series of algorithms performed on the digital data—not a series of hardware circuits. *See* Ex. C (excerpt from "cod_main.c" file). As a result, Defendants' proposed construction is merely an attempt to carve out a non-infringement argument where none exists.

Defendants base their proposed construction on the mistaken belief that the patents must implement the digital data compression and decompression algorithms in specialized hardware circuitry. For example, Defendants argue that the "signal paths" must be hardware circuitry because they include components such as a filter, amplifier and subtractor. However, the patents disclose implementing filters, amplifiers and subtractors in the form of mathematical algorithms performed on a computer. *See* Dkt. 71, Ex. E at 12:35–43 ("To calculate the mean squared pitch

prediction error $e^{(j)}$ for each value of $y^{(j)}$, the value $y^{(j)}$ is multiplied by the gain b by means of a corresponding amplifier $307^{(j)}$ and the value $b^{(j)}y^{(j)}$ is subtracted from the target vector x by means of subtractors $308^{(j)}$."). The claimed "signal paths" are the series of algorithms performed on the digital data to calculate the pitch prediction error for each vector $y^{(j)}$, and the patents do not limit the term to a physical hardware implementation as argued by Defendants.

In fact, as stated in St. Lawrence's Opening Brief, other defendants have raised this exact same argument involving the term "signal paths" in related litigation in Germany, and the German court has rejected it by concluding that "the wording of the claim does not restrict [the] 'signal path' to a physical signal path in such a way that it has to be an electronic hardware component and thus a software implementation (in accordance with the standard) is not sufficient." Dkt. 71, Ex. F at 19. For the same reasons, Defendants' construction should be rejected.

C. Defendants fail to show clear and convincing evidence of indefiniteness.

For the "low frequency portion," "generally higher," "reduce a difference" and "substantially decoupled" terms, Defendants have failed to show indefiniteness with clear and convincing evidence. As explained by St. Lawrence, the terms are all non-limiting "whereby clauses" that state merely the intended result of applying the claim language. However, to the extent the terms limit the claims, the patent specifications provide "reasonable certainty" as to their meaning by disclosing the form of the transfer functions that produce those results. For example, Defendants cannot argue that the term "substantially decoupled" is indefinite when the patent itself ties that term to the use of a "fixed denominator" in a perceptual weighting filter and states that "[t]his structure ***substantially decouples*** the formant weighting from the tilt." Dkt. 71, Ex. B at 9:44–45. Indeed, Defendants concede that the law does not require a "strict numerical limitation" for such terms as long as the patents disclose "more than a purely subjective standard." *See* Response, Dkt. 74 at 35. Here, the use of a fixed denominator in a perceptual weighting filter

provides an ***objective*** standard for a person skilled in the art.

Similarly, for the other three terms, Defendants ignore the clear disclosures of the patent specifications. In each case, a person of ordinary skill in the art would understand the terms with "reasonable certainty" given the explicit disclosure of the relevant transfer functions and algorithms. Such disclosure provides "more than a purely subjective standard" by providing skilled artisans objective tools for understanding those claim terms.

D. Defendants' construction of "wideband" reads out preferred embodiments.

The patents do not restrict a wideband signal to the range of "at least" 50–7000 Hz, as argued by Defendants. The patents explicitly categorize "previously down-sampled" signals as "wideband signals" and specifically disclose down-sampled signals as having a frequency range "below 7000 Hz." Dkt. 71, Ex. C at 19:58 and 2:49–51. As a result, Defendants' construction impermissibly reads out preferred embodiments. Additionally, Defendants' claim that a specific construction is necessary because "there would be no discernible way to distinguish a wideband signal from any other type of speech signal" is specious. The term "wideband" is a well-known term-of-art and does not need to be arbitrarily restricted. Indeed, the "WB" in the "AMR-WB" standard at issue in this case stands for wideband. Moreover, Motorola's ***own*** patents and engineers readily distinguish between a "wideband" signal and older "narrowband" signals:

> In the context of wideband audio, one can consider that the transmitted audio bandwidth ***may be 5 kHz or more and probably about 7 kHz***, the lower cut-off frequency is likely to be around 50-70 Hz. In contrast, narrowband signals have a limited bandwidth of up to about 3.5 kHz with a lower cut-off frequency of about 250 Hz.

See Ex. D at 2:17–23 (emphasis added). Importantly, Motorola's own engineers do not attempt to arbitrarily limit the term "wideband" and their understanding of wideband signals would include, for example, the 6.4 kHz wideband signals described in the asserted patents that were previously down-sampled. As a result, the Court should give the term-of-art its plain and ordinary meaning.

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Respectfully submitted,

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CERTIFICATE OF SERVICE

The undersigned hereby certifies that all counsel of record who are deemed to have consented to electronic service are being served with a copy of this document via the Court's CM/ECF system per Local Rule CV-5(a)(3) on December 22, 2015

/s/ Michael McBride